

What is claimed is:

1. A bias sputtering film forming process for forming a thin film by applying both voltages of a cathode voltage and a substrate bias voltage, wherein a thin film is formed on a substrate whereon an irregularity is formed in the state wherein only the cathode voltage out of said both voltages is applied, and sputtering film forming is performed while varying said substrate bias voltage so that the thickness of said thin film formed on the surfaces on the sidewalls and on the bottoms of said irregularity is substantially uniform.
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2. The bias sputtering film forming process according to claim 1, wherein said cathode voltage is also varied, in said bias sputtering film forming performed while varying said substrate bias voltage.
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3. The bias sputtering film forming process according to claim 1 or 2, wherein sputtering particles coming from a target enter substantially vertically in said substrate.
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4. The bias sputtering film forming process according to claim 1 or 2, wherein said thin film is used as a barrier layer, or a seed layer for electrolytic plating.
- 25 5. A bias sputtering film forming apparatus comprising an AC power source or a DC power source of variable output against substrate electrodes and a control system, wherein said

control system makes the cathode voltage set to a predetermined voltage previously, stores the substrate bias voltage value when the substrate is apart from the target by a predetermined distance and the thickness distribution of thin 5 films on each of said surfaces corresponding to said substrate bias voltage value as reference data, and controls the output of said power source by bias voltage functions produced by selecting the substrate bias voltage value that makes said film thickness substantially uniform from said reference data 10 when each of said surfaces is formed.

6. The bias sputtering film forming apparatus according to claim 5, in which said apparatus further comprises a power source of variable output against said cathode, wherein said 15 control system also varies the cathode voltage by controlling the output of said cathode power source, in said bias sputtering film forming performed by controlling the output of said substrate power source based on said bias voltage functions.